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## SEQUENCE LISTING

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Sangamo Biosciences, Inc.

<120> Selection of Sites for Targeting by Zinc Finger  
Proteins and Methods of Designing Zinc Finger Proteins  
to Bind to Preselected Sites

<130> 019496-001800US

<140> US 09/229,007

<141> 1999-01-12

<160> 97

<170> PatentIn Ver. 2.1

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characterizing the C-2H-2 class of zinc finger  
proteins (ZFP)

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<223> Xaa = any amino acid

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<223> Xaa = any amino acid, may be present or absent

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<223> Xaa = any amino acid, may be present or absent

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1 5 10 15  
Xaa Xaa His Xaa Xaa Xaa Xaa Xaa His  
20 25

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Thr Gly Glu Lys Pro  
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<210> 3  
<211> 5  
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 Zif268

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 Tyr Ala Cys Pro Val Glu Ser Cys Asp Arg Arg Phe Ser Arg Ser Asp  
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 Glu Leu Thr Arg His Ile Arg Ile His Thr Gly Gln Lys Pro Phe Gln  
 20 25 30  
 Cys Arg Ile Cys Met Arg Asn Phe Ser Arg Ser Asp His Leu Thr Thr  
 35 40 45  
 His Ile Arg Thr His Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys  
 50 55 60  
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 65 70 75 80  
 His Leu Arg Gln Lys  
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 531-624 in Sp-1 transcription factor

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 Val Tyr Gly Lys Thr Ser His Leu Arg Ala His Leu Arg Trp His Thr  
 20 25 30  
 Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly Lys Arg Phe  
 35 40 45

Thr Arg Ser Asp Glu Leu Gln Arg His Lys Arg Thr His Thr Gly Glu  
 50 55 60

Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met Arg Ser Asp  
 65 70 75 80

His Leu Ser Lys His Ile Lys Thr His Gln Asn Lys Lys Gly  
 85 90

<210> 10

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 transcription factor consensus sequence

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Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln  
 1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Lys Ser Ser His Leu  
 20 25 30

Arg Ala His Gln Arg Thr His Thr Gly Glu Arg Pro Tyr Lys Cys Pro  
 35 40 45

Glu Cys Gly Lys Ser Phe Ser Arg Ser Asp Glu Leu Gln Arg His Gln  
 50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys  
 65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Lys His Gln Arg Thr His Gln  
 85 90 95

Asn Lys

<210> 11

<211> 10

<212> DNA

<213> Artificial Sequence

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 binding site

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gcgtgggcgc

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<210> 12

<211> 10

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 containing three D-able subsites

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10

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 with two overlapping D-able subsites

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<210> 14  
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<220>  
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 with three overlapping D-able subsites

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 motif searched by protocol 1

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motif searched by protocol 1

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<400> 20  
gnggnngnnn nnnngngnng ngg

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motif searched by protocol 1

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<400> 21  
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<210> 22  
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<400> 22  
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<400> 23  
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<210> 24  
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motif searched by protocol 1

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<400> 24  
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<400> 25  
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motif searched by protocol 1

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motif searched by protocol 1

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<400> 28  
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24

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motif searched by protocol 1

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24

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gnngnngngg nnnngnggng ngg

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motif searched by protocol 2

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motif searched by protocol 2

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<400> 38  
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22

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motif searched by protocol 2

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<400> 42  
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22

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motif searched by protocol 2

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motif searched by protocol 2

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22

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motif searched by protocol 2

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<400> 45  
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motif searched by protocol 2

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<400> 46  
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22

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motif searched by protocol 2

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<400> 48  
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<210> 49  
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<221> modified\_base  
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<400> 51  
knnknnknngg nnnknnknngg nnn

23

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<400> 52  
knnknnknngg nnknnknknkn gg

22

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motif searched by protocol 2

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<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 2

<220>  
<221> modified\_base  
<222> (1)..(19)  
<223> n = g, a, c or t

<400> 55  
knnknnknngg nnknnggnnn

19

<210> 56  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 2

<220>  
<221> modified\_base  
<222> (1)..(19)  
<223> n = g, a, c or t

<400> 56  
knnknnkngg nnknnkngg

19

<210> 57  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(22)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (10)..(12)  
<223> n = g, a, c or t, may be present or absent

<400> 57  
kngknnknnn nnkngknnkn nn

22

<210> 58  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(23)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (11)..(13)  
<223> n = g, a, c or t, may be present or absent

<400> 58  
kngknnknnn nnnkngknnk nnn

23

<210> 59  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(22)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (10)..(12)  
<223> n = g, a, c or t, may be present or absent

<400> 59  
kngknnknnn nnknnkngkn nn

22

<210> 60  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(23)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (11)..(13)  
<223> n = g, a, c or t, may be present or absent

<400> 60  
kngknnknnn nnnknnkngk nnn

23

<210> 61  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(22)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (10)..(12)  
<223> n = g, a, c or t, may be present or absent

<400> 61  
kngknnknnn nnknnknnkn gk

22

<210> 62  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(23)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (11)..(13)  
<223> n = g, a, c or t, may be present or absent

<400> 62  
kngknnknnn nnnknnknnk ngk

23

<210> 63  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(22)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (10)..(12)  
<223> n = g, a, c or t, may be present or absent

<400> 63  
knnkngknnn nnkngknnkn nn

22

<210> 64  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(23)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (11)..(13)  
<223> n = g, a, c or t, may be present or absent

<400> 64  
knnkngknnnn nnnkngknnk nnn

23

<210> 65  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(22)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (10)..(12)  
<223> n = g, a, c or t, may be present or absent

<400> 65  
knnkngknnnn nnknnkngkn nn

22

<210> 66  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(23)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (11)..(13)  
<223> n = g, a, c or t, may be present or absent

<400> 66  
knnkngknnnn nnnknnkngk nnn

23



<210> 67  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:target site DNA  
 motif searched by protocol 3

<220>  
 <221> modified\_base  
 <222> (1)..(22)  
 <223> n = g, a, c or t

<220>  
 <221> modified\_base  
 <222> (10)..(12)  
 <223> n = g, a, c or t, may be present or absent

<400> 67  
 knnkngknnn nnknnknnkn gk

22

<210> 68  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:target site DNA  
 motif searched by protocol 3

<220>  
 <221> modified\_base  
 <222> (1)..(23)  
 <223> n = g, a, c or t

<220>  
 <221> modified\_base  
 <222> (11)..(13)  
 <223> n = g, a, c or t, may be present or absent

<400> 68  
 knnkngknnn nnnknnknnk ngk

23

<210> 69  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:target site DNA  
 motif searched by protocol 3

<220>  
 <221> modified\_base  
 <222> (1)..(22)  
 <223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (11)..(12)  
<223> n = g, a, c or t, may be present or absent

<400> 69  
knnknnkngk nnkngknnkn nn

22

<210> 70  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(23)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (12)..(13)  
<223> n = g, a, c or t, may be present or absent

<400> 70  
knnknnkngk nnnkngknnk nnn

23

<210> 71  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(22)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (11)..(12)  
<223> n = g, a, c or t, may be present or absent

<400> 71  
knnknnkngk nnknnkngkn nn

22

<210> 72  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(23)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (12)..(13)  
<223> n = g, a, c or t, may be present or absent

<400> 72  
knnknnkngk nnnknnkngk nnn

23

<210> 73  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(22)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (11)..(12)  
<223> n = g, a, c or t, may be present or absent

<400> 73  
knnknnkngk nnknnknnkn gk

22

<210> 74  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(23)  
<223> n = g, a, c or t

<220>  
<221> modified\_base  
<222> (12)..(13)  
<223> n = g, a, c or t, may be present or absent

<400> 74  
knnknnkngk nnnknnknnk ngk

23

<210> 75  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(19)  
<223> n = g, a, c or t

<400> 75  
knnknnkngk ngknnknnn

19

<210> 76  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(19)  
<223> n = g, a, c or t

<400> 76  
knnknnkngk nnkngknnn

19

<210> 77  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site DNA  
motif searched by protocol 3

<220>  
<221> modified\_base  
<222> (1)..(19)  
<223> n = g, a, c or t

<400> 77  
knnknnkngk nnknnkngk

19

<210> 78  
<211> 10  
<212> DNA  
<213> Glycine max

<220>  
<223> soybean FAD2-1 cDNA ZFP target segment FAD 1

<400> 78  
gaggtagagg 10

<210> 79  
<211> 10  
<212> DNA  
<213> Glycine max

<220>  
<223> soybean FAD2-1 cDNA target segment FAD 2

<400> 79  
gtcgtgtgga 10

<210> 80  
<211> 10  
<212> DNA  
<213> Glycine max

<220>  
<223> soybean FAD2-1 cDNA target segment FAD 3

<400> 80  
gttgaggaag 10

<210> 81  
<211> 10  
<212> DNA  
<213> Glycine max

<220>  
<223> soybean FAD2-1 cDNA target segment FAD 4

<400> 81  
gaggtggaag 10

<210> 82  
<211> 10  
<212> DNA  
<213> Glycine max

<220>  
<223> soybean FAD2-1 cDNA target segment FAD 5

<400> 82  
taggtggtga 10

<210> 83  
<211> 12  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:test sequence

<400> 83  
agtgcgcggt gc 12

<210> 84  
<211> 10  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site  
with base immediately to the 3' side of target  
site

<400> 84  
agtgcgcggt 10

<210> 85  
<211> 10  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site  
with base immediately to the 3' side of target  
site

<400> 85  
gtgcgcggtg 10

<210> 86  
<211> 10  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site  
with base immediately to the 3' side of target  
site

<400> 86  
tgcgcggtgc 10

<210> 87  
<211> 10  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:target site  
with base immediately to the 3' side of target  
site

<220>  
<221> modified\_base  
<222> (10)  
<223> n = undefined

<400> 87  
gcgcggtgcn

10

<210> 88  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:finger F3 for  
ordered output from optimal design target site

<400> 88  
Glu Arg Asp His Leu Arg Thr  
1 5

<210> 89  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:finger F2 for  
ordered output from optimal design target site

<400> 89  
Arg Ser Asp Glu Leu Gln Arg  
1 5

<210> 90  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:finger F1 for  
ordered output from optimal design target site

<400> 90  
Arg Lys Asp Ser Leu Val Arg  
1 5

<210> 91  
<211> 7  
<212> PRT  
<213> Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: finger for  
disordered output from optimal design target site

&lt;400&gt; 91

Arg Ser Asp Glu Leu Thr Arg  
1 5

&lt;210&gt; 92

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: finger for  
disordered output from optimal design target site

&lt;400&gt; 92

Arg Ser Asp Glu Arg Lys Arg  
1 5

&lt;210&gt; 93

&lt;211&gt; 21

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: three finger  
ZFP design using F3, F2 and F1 fingers for ordered  
output from optimal design target site

&lt;400&gt; 93

Arg Lys Asp Ser Leu Val Arg Arg Ser Asp Glu Leu Gln Arg Glu Arg  
1 5 10 15Asp His Leu Arg Thr  
20

&lt;210&gt; 94

&lt;211&gt; 21

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: ZFP sequence  
(F1, F2 and F3) from SBS design GR-223

&lt;400&gt; 94

Arg Ser Ala Asp Leu Thr Arg Arg Ser Asp His Leu Thr Arg Glu Arg  
1 5 10 15Asp His Leu Arg Thr  
20



<210> 95  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ZFP sequence  
(F1, F2 and F3) from Zif 268

<400> 95  
Arg Ser Asp Glu Leu Thr Arg Arg Ser Asp His Leu Thr Thr Arg Ser  
1 5 10 15  
Asp Glu Arg Lys Arg  
20

<210> 96  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ZFP sequence  
(F1, F2, F3) from SP1

<400> 96  
Lys Thr Ser His Leu Arg Ala Arg Ser Asp Glu Leu Gln Arg Arg Ser  
1 5 10 15  
Asp His Leu Ser Lys  
20

<210> 97  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:ZFP sequence  
(F1, F2, F3) from SBS design GL-8.3.1

<400> 97  
Arg Lys Asp Ser Leu Val Arg Thr Ser Asp His Leu Ala Ser Arg Ser  
1 5 10 15  
Asp Asn Leu Thr Arg  
20